

lable damage to growing crops, and causing extensive washouts. The losses to farmers and railroads will aggregate several hundred thousand dollars.—*Union and Advertiser, Rochester, N. Y., August 17.* Charleston: a cloud-burst occurred at 7 p. m. between Sumter and Columbia. There was no thunder and lightning but a steady downpour of rain; it is estimated that twelve inches of rain fell in two hours. The area affected is about five miles wide and about fifty or sixty miles long. Seven miles of the Camden branch and South Carolina Railway are washed away. Cotton fields about Gadsden have been washed clean, and hundreds of cattle drowned.

15-16th. West Virginia.—Wheeling: a terrific storm prevailed over Lost Creek Valley during the night. Harrison county is inundated, and no trains are moving on the Clarksburgh and Western Railroad to-day. The loss is very heavy throughout that region.—*Baltimore, Md., American, August 17.*

17th. California.—Daggett: the heaviest thunder, wind, and rain storm ever known in this section began at 3 p. m., and continued two hours. The heavy rain flooded houses and cellars, and several houses were blown down. All telegraphic communication east of this place was cut off.—*Los Angeles, Cal., Daily Herald, August 17.* Minnesota.—Saint Hilaire: a severe storm, accompanied by high wind, passed six miles north of this town in the evening, doing great damage to the wheat crop. Chunks of ice one inch square were found after the storm passed.—*Democrat-Chronicle, Rochester, N. Y., 19.*

18th. Utah.—Salt Lake City: rain began at 8.20 p. m. and continued during the remainder of the day. The rainfall was reported unusually heavy in surrounding districts, causing washouts on the Union Pacific and Utah Central railroads. A land-slide, caused by a cloud-burst, occurred at Weber Canyon, wrecking a Union Pacific freight train.

19th. Colorado.—Glenwood Springs: a cloud-burst near this city did much damage. The losses to merchandise, furniture, etc., will reach several thousand dollars.—*Denver News, Denver, Colo., August 19.*

19-20th. Minnesota.—Saint Paul: a thunder-storm which began 10.29 p. m., 19th, continued until after midnight. Several houses in this city were struck by lightning, and the telephone wires were considerably interfered with. The rain during the storm was very heavy, and some damage was done by flooding sidewalks and cellars.

20th. Maine.—Winthrop: a storm of thirty minutes' duration passed over this place during the day. The sky was obscured by a very black cloud, which hung very low. Rain fell in torrents, and the wind blew a gale, accompanied by heavy thunder. Corn and other crops were seriously injured.—*The Nashville, Tenn., Banner, August 21.* Minnesota.—Duluth: a severe thunder-storm, moving from southwest to northeast, began at 12.05 a. m. and continued until 5 a. m., in which time 2.08 inches of rain were recorded. A large dam in this city gave away under the heavy pressure of water, flooding many houses. It is estimated that the damage done by the flood, in this city alone, will reach \$50,000. Reports from the surrounding country, particularly to the southwest, state that the storm was equally severe there. The Saint Paul and Duluth Railroad suffered severely from washouts and land-slides.

22d. Alabama.—Anniston: this city was visited in the afternoon by the severest rain storm, accompanied by wind and hail, that has occurred in this section for many years. In less than an hour the entire city was flooded and many streets were impassable. The approach to the Georgia Pacific is one vast sheet of water for hundreds of feet.—*The Daily Advertiser, Montgomery, Ala., August 23.*

23d. Pennsylvania.—Philadelphia: a heavy rain storm, accompanied by thunder and lightning, began at 2.15 p. m. and ended 7.15 p. m. Great damage resulted in the low lying sections of the city by overflowed sewers and flooded streets and cellars. The storm moved from southwest to northeast.

25th. Minnesota.—Duluth: a moderate thunder-storm passing from west to east, began 6.50 a. m. and ended 9.20 a. m. Large hail fell between 8.30 a. m. and 8.33 a. m. The stones were of unusual size, some of them being one inch in diameter, and one stone measured five inches in circumference. In formation the stones resembled buttons flattened on two sides.

26th. North Carolina.—Rockingham: a cloud-burst occurred over this city and vicinity during the day, destroying the dams and the machinery of several mills. The loss is estimated at \$100,000.—*Morning Herald, Baltimore, Md., 28th.*

WATER-SPOUT.

Charleston, S. C.: a water-spout was observed off Sullivan's Island at 1.50 p. m., 12th. It lasted but a few minutes, and then disappeared.

INLAND NAVIGATION.

FLOODS.

The following reports indicate that the most destructive floods of August, 1889, occurred in Connecticut, Maryland, Pennsylvania, New Jersey, Virginia, Colorado, Missouri, and Nebraska during the first half of the month:

New Haven, Conn., 1st: heavy damage from severe rains in the Housatonic and Naugatuck valleys has been reported. People in that section have suffered more than in any other part of the state. The Shelton Mills at Birmingham were obliged to stop operations, as the wheels are completely under water. The meadows above Birmingham were three or four feet under water. The big dam at Birmingham had eight feet of water on its top; the water was never before known to be so high. Many meadows are ruined by sand and sediment left by the flood.—*Boston, Mass., Daily Globe, August 1.*

Baltimore, Md., 1st: many villages, and hundreds of western Maryland farms, are flooded, all the recent destructive storms having been east of the Blue Ridge Mountains. This morning the streets of Union Bridge and other towns were rivers, and for miles along the western Maryland Railroad, in Carroll and Baltimore counties, farm lands are submerged. The bridges over the Monocacy River in Frederick county have been swept away and other damage done. On the flat land of the eastern shore counties the wheat crop is ruined.—*The Record, Philadelphia, Pa., August 2.*

Reading, Pa., 1st: the Schuylkill is overflowing its banks, both above and below this city, doing much damage. In the coal regions a number of collieries have been obliged to shut down. The crops in this section have been much injured by the constant rainfall.—*The Record, Philadelphia, Pa., August 2.*

Mount Holly, N. J., 3d: the recent heavy rains which culminated in the terrific storms on the 1st and 2d have inflicted a great deal of damage on the farming community. The greatest injury was done in the valley of the Rancocas River, which has its source in the regions near Brown's Mills, and from that point to its mouth at Delanco the loss has been heavy. Hundreds of acres of corn have either been washed out entirely or rendered worthless. A lake covering about ten or twelve acres spread south of Monroe street, this city, and in the business portion a ferry was established to convey people to dry places. At 2 a. m. the water reached the engine room of the electric light works, extinguishing the fires, and leaving the city in total darkness. A record of flood at this place, which has been kept for nearly one hundred years, shows that the present flood rose ten inches higher than ever before known. The total loss to this, Burlington county, will exceed \$150,000.—*The Record, Philadelphia, Pa., August 4.*

Martinsville, Va., 3d: this, Henry, county has been visited by one of the most destructive freshets ever known here; the water was as high, if not higher, than during the freshet of

November, 1877. Eleven bridges have been washed away, the loss of which will reach \$6,000. Every bridge over North Mays River and Marrowtown Creek has been washed away, and six mill-dams have been washed out by the heavy pressure of water. Great damage was done to the Danville and New River Railroad, and the first train from Stuart came down this evening. No trains will be here from Danville for a week, and no mail has been received since the 30th of July. The growing crops along all streams have been almost completely ruined, and the total amount of damage cannot be estimated.—*The Lynchburgh, Va., News, August 3.*

Staunton, Va., 6th: the damage done by the recent continuous rain, from Roanoke to Winchester, is distressing. Three-quarters of the wheat crop was caught by the rain while in shocks in the fields, causing it to sprout and grow in the shocks. Altogether these have been the most disastrous rains in the valley for twenty years, and the loss amounts to millions of dollars. Three-quarters of the hay has also been lost, and most of the oats are sprouting as they stand unreaped.—*The Lynchburgh, Va., News, August 6.*

Pueblo, Colo., 10th: the late heavy rains have caused a rapid rise in the Arkansas River, and, owing to an incomplete levee near the Santa Fé bridge, the high water spread over a large portion of the southern part of this city, the water being in places two feet in depth, causing much damage to property.

Kansas City, Mo., 13th: the country between Topeka, Kans., and this city is flooded; all trains from the west, to-day, were late, some not arriving at all. Nearly all the main lines were under water, and round-about detours were taken in order to reach this city. The Santa Fé railroad suffered the greatest damage. For ten miles this side of Topeka the road is completely washed away. A few of the western trains on the Santa Fé and Southern Kansas roads were abandoned and all the bridges on these roads have been washed away. A big land-slide occurred on the Kansas City, Council Bluff, and Saint Joseph Railroad. A similar slide occurred on the Chicago, Milwaukee, and Saint Paul road near Randolph and delayed the trains from Excelsior Springs.—*Saint Louis, Mo., Republican, August 14.*

Lincoln, Nebr., 13th: heavy rains have swollen the streams in southwestern Nebraska to an unusual height. Railroad traffic is considerably interrupted, and much damage has been done to property. The Atchison and Nebraska Railroad is under water between Firth and Table Rock, and at Tecumseh the rise in the river drove many people from their homes. At Beatrice and Blue River, houses on the bottom lands are flooded; the people escaped in boats. The Northwestern tracks near Lincoln have been washed away. Salt Creek and the salt basins are one vast lake, and the water as yet shows

no sign of subsiding. From three hundred to five hundred houses are flooded and the people had to move out of danger.—*Denver, Colo., News, August 15.*

HIGH TIDES.

Asbury Park, N. J., 29th: the high northeast wind has caused the surf to rise higher and rougher than it has been any time during the summer. At high tide the waves washed over the plaza. Deep cuts were made at many points, and the new bulkheads were damaged at several places.—*Rochester, N. Y., Times, August 29.*

STAGE OF WATER IN RIVERS AND HARBORS.

The following table shows the danger-points at the various stations; the highest and lowest water for August, 1889, with the dates of occurrence and the monthly ranges:

Heights of rivers above low-water mark, August, 1889, (in feet and tenths).

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Date.	Height.	Date.	Height.	
<i>Red River:</i>						
Shreveport, La.....	29.9	1	13.2	31	4.9	8.3
<i>Arkansas River:</i>						
Fort Smith, Ark....	22.0	2	11.5	28	2.0	9.5
Little Rock, Ark....	23.0	1	16.4	30, 31	4.2	12.2
<i>Missouri River:</i>						
Fort Buford, Dak.....		1	2.5	31	-0.7	3.2
Omaha, Nebr.....	18.0	2, 3, 4	8.4	31	6.0	2.4
Leavenworth, Kans....	20.0	17	11.4	31	7.0	4.4
Kansas City, Mo.....	21.0	14	13.9	31	6.1	7.8
<i>Mississippi River:</i>						
Saint Paul, Minn....	14.5	29, 30, 31	3.2	15	2.3	0.9
La Crosse, Wis.....	24.0	31	4.1	1, 2, 7	2.4	1.7
Dubuque, Iowa.....	16.0	13, 14, 30, 31	2.9	9	2.2	0.7
Davenport, Iowa....	15.0	1	1.8	{ 8, 9, 11, 12, 27, 28, 29, 30 }	1.3	0.5
Keokuk, Iowa.....	14.0	1	2.3	29, 30, 31	0.8	1.5
Saint Louis, Mo.....	32.0	1	13.0	30	6.4	6.6
Cairo, Ill.....	40.0	5	22.0	31	8.5	13.5
Memphis, Tenn.....	34.0	1	17.0	31	8.1	8.9
Vicksburg, Miss.....	41.0	5, 6, 7	23.5	31	12.0	11.5
New Orleans, La....	13.0	8	8.1	30, 31	4.4	3.7
<i>Ohio River:</i>						
Pittsburgh, Pa.....	22.0	2	4.5	31	0.4	4.1
Parkersburg, W. Va....	38.0	1	8.5	31	2.9	5.6
Cincinnati, Ohio....	50.0	5	19.3	31	6.9	12.4
Louisville, Ky.....	25.0	6	8.2	31	4.1	4.1
<i>Cumberland River:</i>						
Nashville, Tenn.....	40.0	1	15.5	31	2.4	13.1
<i>Tennessee River:</i>						
Chattanooga, Tenn....	33.0	4, 5	10.1	24	3.8	6.3
<i>Monongahela River:</i>						
Pittsburgh, Pa.....	29.0	2	4.5	31	0.4	4.1
<i>Savannah River:</i>						
Augusta, Ga.....	32.0	4	20.0	23, 24	7.0	13.0
<i>Willamette River:</i>						
Portland, Oregon....	15.0	12	4.9	21	1.6	3.3

Ohio River.—Pittsburgh, Pa.: on account of low water, navigation was suspended to points below this city on 12th.
Monongahela River.—Pittsburgh, Pa.: boats left Lock No. 1 for points above this city on the 23d.

ATMOSPHERIC ELECTRICITY.

AURORAS.

Auroras were observed during the month, as follows: 2d, Amana, Iowa. 6th, Wedgwood, N. Y. 15th, Vevay, Ind.; Grantsburgh, Wis. 28th, Arcade and Wedgwood, N. Y.; Saint Vincent, Minn.

Saint Vincent, Minn.: an aurora was observed at 9.10 p. m., 28th. It consisted of a dim glow on the northern horizon, which increased in brilliancy until it attained its maximum intensity at 10.30 p. m., at which time an irregular arch extended from azimuth 135° to 270°, and to altitude about 20°. Numerous "needles" of more or less brilliancy appeared, none of them reaching beyond altitude 30°. After 10.40 p. m. the display waned rapidly and the aurora took the form of a low broad arch, which did not materially change while observed. The display ended during the early morning of the 29th.

THUNDER-STORMS.

The more severe thunder-storms of the month are described under "Local storms." Thunder-storms were reported in the

greatest number of states and territories, thirty-three, on the 3d; in thirty-one on the 1st and 14th; in thirty on the 9th and 10th; in twenty-nine on the 2d; in twenty-eight on the 4th and 13th; in twenty-two on the 7th and 12th; in twenty-one on the 6th and 11th; in from fifteen to twenty, inclusive, on the 5th, 8th, 15th, 16th, 17th, 20th, 22d, 23d, 24th, 26th, 29th, 30th, and 31st; and in from ten to fourteen, inclusive, on the 18th, 19th, 21st, 25th, 27th, and 28th. There were no dates for which thunder-storms were reported in less than ten states or territories.

Thunder-storms were reported on the greatest number of dates, thirty-one, in Florida; on twenty-five in Arizona; on twenty-four in Arkansas and Kansas; on twenty-three in Texas; on twenty-one in Colorado, Georgia, Minnesota, and Utah; on twenty in Mississippi; on from fifteen to nineteen, inclusive, in Alabama, Dakota, Illinois, Iowa, Louisiana, Michigan, Nebraska, New York, North Carolina, South Carolina, and Tennessee; on from ten to fourteen, inclusive, in